



# BUILDING COMMISSIONING

## for better public buildings

### CASE STUDY

#### SCHOOL COMMISSIONING PROJECT GETS HIGH GRADE

It's important that a school be comfortable and maintains good indoor air quality. Studies show student test scores and teacher satisfaction are higher when the physical facility is conducive to learning.

So, when the Bainbridge Island School District in western Washington undertook a major addition and update of their 133,000-square-foot high school, comfort, air quality and teacher satisfaction were top priorities. The construction project included the addition of 31 classrooms, a new gymnasium, substantial renovation to several classrooms and the administrative offices, and major improvements to the existing mechanical systems. The district wanted to eliminate existing air quality problems and optimize efficiency of the heating, ventilation and air conditioning (HVAC) system. To

achieve this a commissioning agent worked closely with contractors and school district staff to identify issues related to the HVAC system. They identified more than 100 significant issues during construction and functional testing phases that were resolved prior to occupancy. These issues included:

- Insufficient clearance of the new steam boiler as originally installed. If this had not been discovered, regular inspections and maintenance of the boiler would have been difficult and time-consuming.

#### BUILDING COMMISSIONING

Is a systematic and documented process of ensuring that the owner's operational needs are met, building systems perform efficiently, and building operators are properly trained.



Bainbridge Island High School Addition

"The program was so successful at the high school that the following year every school in the district was retro-commissioned."

- J.R. Fulton, Construction Manager,  
Bainbridge Island School District

#### COMMISSIONING QUICK FACTS

Building: Bainbridge Island High School  
Location: Bainbridge Island, Washington  
Completion date: January 2000  
Scope of project: Retrofit and Addition  
Commissioning cost: \$41,860<sup>1</sup>  
First-year cost benefit: \$25,290<sup>2</sup>  
Annual energy savings: \$19,450<sup>3</sup>

<sup>1</sup> Commissioning providers fee only.

<sup>2</sup> Cost reduction or avoidance.

<sup>3</sup> Annual energy savings based on cost of electricity of \$0.0494/kWh and natural gas of \$0.755 /therm.

- Building damper mounting problems that would have led to indoor air quality problems and increased maintenance.
- Non-functioning carbon dioxide (CO<sub>2</sub>) sensors in the gym that would have caused indoor air quality issues.

In addition to addressing these issues, the commissioning process produced a financial bonus for the district - energy savings. The district had been tracking energy usage at the high school facility for several years. Even with the new space added, the district reported that their overall energy usage had dropped significantly. Annual energy savings are estimated to be over \$19,000. In addition, there were non-energy first-year savings of about \$25,000 due to fewer contractor call backs, improved indoor air quality and training of operators.



The remodeled portion of  
Bainbridge Island High School

The district also realized another bonus from the commissioning process. School maintenance staff received training on both new and existing HVAC systems, as well as a better understanding of the types of maintenance issues they might encounter in the future. They worked with the commissioning agent throughout the process. They also use the final commissioning report as a tool so they can reproduce equipment tests and troubleshoot problems in the future.

Bainbridge High School completed its construction project on time with all of the HVAC-related systems operating correctly. Students and teachers have a comfortable learning environment with high indoor air quality. And, the school district and taxpayers got their money's worth and more from the commissioning process.

## LESSONS LEARNED

- Establish scope of commissioning work early on in the design phase
- Commissioning providers need to work closely with school staff and contractors

## COMMISSIONING BENEFITS

- Reduced operating costs due to energy savings
- Identified and corrected defects in equipment, systems, and operation
- On-the-job training for maintenance staff
- Project completed on time with few problems and warranty issues

"This decision, to hire an independent commissioning authority . . . has proved invaluable."

- Richard Best, Facilities Director,  
Bainbridge Island School District

## PROJECT PARTNERS

- BAINBRIDGE ISLAND SCHOOL DISTRICT  
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- COMMISSIONING PROVIDER  
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Contact: Pete Keithly

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